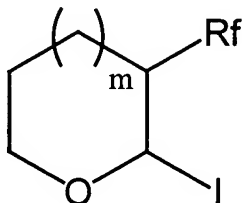


WHAT IS CLAIMED IS:

1. A method of increasing the fluorous nature of a compound, including the step of reacting the compound with at least one second compound having the formula:



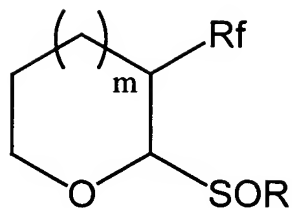
wherein Rf is a fluorous group and m is 0, 1 or 2.

2. The method of Claim 1 wherein Rf is a perfluoroalkyl group.

3. The method of Claim 2 wherein Rf is  $-C_nF_{2n+1}$  wherein n is an integer in the range of 4 to 32.

4. The method of Claim 1 wherein Rf is a perfluoroadamantyl group.

5. A method of increasing the fluorous nature of a compound, including the step of reacting the compound with at least one second compound having the formula:



wherein Rf is a fluororous group, R<sup>1</sup> is a an alkyl group or an aryl group and m is 0, 1 or 2.

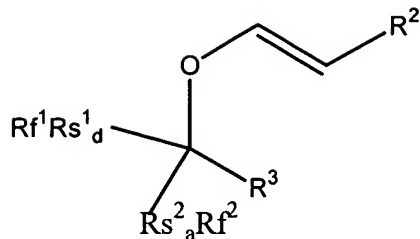
6. The method of Claim 5 wherein Rf is a perfluoroalkyl group.

7. The method of Claim 6 wherein Rf is -C<sub>n</sub>F<sub>2n+1</sub> wherein n is an integer in the range of 4 to 32.

8. The method of Claim 5 wherein Rf is a perfluoroadamantyl group.

9. The method of Claim 5 wherein R<sup>1</sup> is a phenyl group.

10. A method of increasing the fluororous nature of a compound, including the step of reacting the compound with at least one second compound having the formula:



wherein  $Rf^1$  and  $Rf^2$  are independently, the same or different, fluorous groups,  $Rs^1$  is a spacer group,  $d$  is 1 or 0,  $Rs^2$  is a spacer group,  $a$  is 1 or 0,  $R^2$  is a H, an alkyl group or an aryl group,  $R^3$  is H or  $-Rs^3_eRf^3$ , wherein,  $Rs^3$  is a spacer group,  $e$  is 1 or 0, and  $Rf^3$  is a fluorous group.

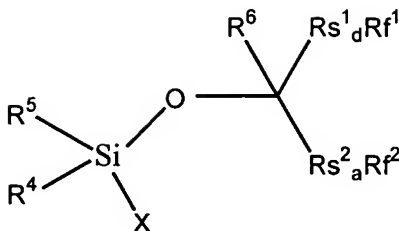
11. The method of Claim 10 wherein  $Rf^1$  and  $Rf^2$  are independently perfluoroalkyl groups.

12. The method of Claim 11 wherein the perfluoroalkyl groups have the formula  $-C_nF_{2n+1}$  wherein  $n$  is an integer in the range of 4 to 32.

13. The method of Claim 10 wherein at least one of  $Rf^1$  and  $Rf^2$  is a perfluoroadamantyl group.

14. The method of Claim 10 wherein  $R^2$  is H and  $R^3$  is H.

15. A method of increasing the fluorous nature of a compound, including the step of reacting the compound with at least one second compound having the formula:



wherein  $\text{Rf}^1$  and  $\text{Rf}^2$  are independently, the same or different, fluororous groups,  $\text{Rs}^1$  is a spacer group,  $d$  is 1 or 0,  $\text{Rs}^2$  is a spacer group,  $a$  is 1 or 0,,  $\text{R}^4$  is an alkyl group or an aryl group,  $\text{R}^5$  is an alkyl group or an aryl group,  $\text{R}^6$  is H, an alkyl group, or a fluorinated alkyl group, and  $\text{X}$  is Cl, Br or I.

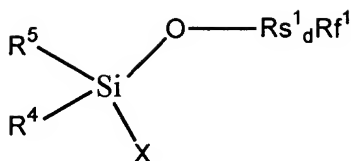
16. The method of Claim 15 wherein  $\text{Rf}^1$  and  $\text{Rf}^2$  are independently perfluoroalkyl groups.

17. The method of Claim 16 wherein perfluoroalkyl groups have the formula  $-\text{C}_n\text{F}_{2n+1}$  wherein  $n$  is an integer in the range of 4 to 32.

18. The method of Claim 15 wherein at least one of  $\text{Rf}^1$  and  $\text{Rf}^2$  is a perfluoroadamantyl group.

19. The method of Claim 15 wherein  $\text{R}^5$  is H.

20. A method of increasing the fluororous nature of a compound, including the step of reacting the compound with at least one second compound having the formula:



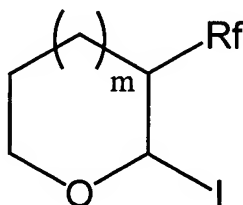
wherein  $Rf^1$  is a fluororous group,  $Rs^1$  is a spacer group,  $d$  is 1 or 0,  $R^4$  is an alkyl group or an aryl group,  $R^5$  is an alkyl group or an aryl group, and  $X$  is Cl, Br or I.

21. The method of Claim 20 wherein  $Rf^1$  is a perfluoroalkyl group.

22. The method of Claim 21 wherein  $Rf^1$  is  $-C_nF_{2n+1}$  wherein  $n$  is an integer in the range of 4 to 32.

23. The method of Claim 20 wherein  $Rf^1$  is a perfluoroadamantyl group.

24. A compound having the formula:



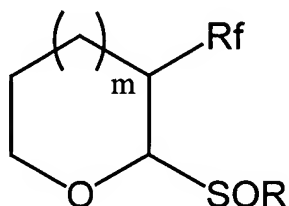
wherein  $Rf$  is a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group and  $m$  is 0, 1 or 2.

25. The compound of Claim 24 wherein  $Rf$  is a perfluoroalkyl group.

26. The compound of Claim 25 wherein Rf is  $-C_nF_{2n+1}$  wherein n is an integer in the range of 4 to 32.

27. The compound of Claim 24 wherein Rf is a perfluoroadamantyl group.

28. A compound having the formula:



wherein Rf is a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group,  $R^1$  is a an alkyl group or an aryl group and m is 0, 1 or 2.

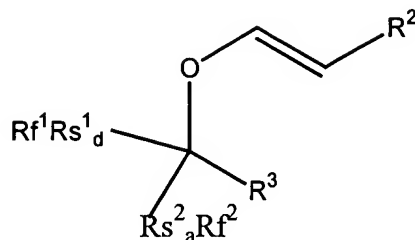
29. The compound of Claim 28 wherein Rf is a perfluoroalkyl group.

30. The compound of Claim 29 wherein Rf is  $-C_nF_{2n+1}$  wherein n is an integer in the range of 4 to 32.

31. The compound of Claim 28 wherein Rf is a perfluoroadamantyl group.

32. The compound of Claim 28 wherein  $R^1$  is a phenyl group.

33. A compound having the formula:



wherein  $R^f_1$  and  $R^f_2$  are independently, the same or different, a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group,  $R^{s_1}$  is a spacer group selected from an alkylene group, a divalent phenyl group or an alkoxy alkylene group,  $d$  is 1 or 0,  $R^{s_2}$  is a spacer group selected from an alkylene group, a divalent phenyl group or an alkoxy alkylene group,  $a$  is 1 or 0,  $R^2$  is a H, an alkyl group or an aryl group,  $R^3$  is H or  $-R^{s_3}_e R^f_3$ , wherein,  $R^{s_3}$  is a spacer group of an alkylene group, a divalent phenyl group or an alkoxy alkylene group,  $e$  is 1 or 0, and  $R^f_3$  is a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group.

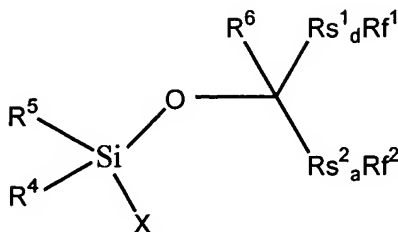
34. The compound of Claim 33 wherein  $R^f_1$  and  $R^f_2$  are independently perfluoroalkyl groups.

35. The compound of Claim 34 wherein the perfluoroalkyl groups have the formula  $-C_n F_{2n+1}$  wherein  $n$  is an integer in the range of 4 to 32.

36. The compound of Claim 33 wherein at least one of  $R^f_1$  and  $R^f_2$  is a perfluoroadamantyl group.

37. The compound of Claim 33 wherein  $R^2$  is H and  $R^3$  is H.

38. A compound having the formula:



wherein  $\text{Rf}^1$  and  $\text{Rf}^2$  are independently, the same or different, a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group,  $\text{Rs}^1$  is a spacer group selected from an alkylene group, a divalent phenyl group or an alkoxy alkylene group,  $d$  is 1 or 0,  $\text{Rs}^2$  is a spacer group selected from an alkylene group, a divalent phenyl group or an alkoxy alkylene group,  $a$  is 1 or 0,  $\text{R}^4$  is an alkyl group or an aryl group,  $\text{R}^5$  is an alkyl group or an aryl group,  $\text{R}^6$  is H, an alkyl group, or a fluorinated alkyl group, and  $\text{X}$  is Cl, Br or I.

39. The compound of Claim 38 wherein  $\text{Rf}^1$  and  $\text{Rf}^2$  are independently perfluoroalkyl groups.

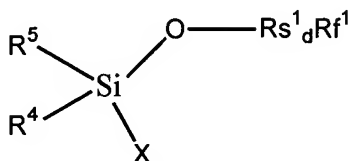
40. The compound of Claim 39 wherein the perfluoroalkyl groups have the formula  $-\text{C}_n\text{F}_{2n+1}$  wherein  $n$  is an integer in the range of 4 to 32.

41. The compound of Claim 38 wherein at least one of  $\text{Rf}^1$  and  $\text{Rf}^2$  is a perfluoroadamantyl group.



42. The compound of Claim 38 wherein  $R^5$  is H.

43. A compound having the formula:



wherein  $Rf^1$  is a fluorohydrocarbon group, a perfluorocarbon group, a fluorinated ether group or a fluorinated amine group,  $Rs^1$  is a spacer group selected from an alkylene group, a divalent phenyl group or an alkoxy alkylene group,  $d$  is 1 or 0,  $R^4$  is an alkyl group or an aryl group,  $R^5$  is an alkyl group or an aryl group, and  $X$  is Cl, Br or I.

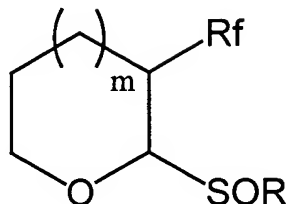
44. The compound of Claim 43 wherein  $Rf^1$  is a perfluoroalkyl group.

45. The compound of Claim 44 wherein  $Rf^1$  is  $-C_nF_{2n+1}$  wherein  $n$  is an integer in the range of 4 to 32.

46. The compound of Claim 43 wherein  $Rf^1$  is a perfluoroadamantyl group.

47. A method of activating an anomeric sulfoxide to react with an alcohol to form a corresponding ether comprising the step of mixing the anomeric sulfoxide with  $Cp_2ZrCl_2$ ,  $AgClO_4$ , and the alcohol.

48. The method of Claim 47 wherein the anomeric sulfoxide has the formula:



wherein Rf is a fluorine group, R<sup>1</sup> is an alkyl group or an aryl group and m is 0, 1 or 2.

49. A method of carrying out a reaction comprising the steps of:

attaching a fluorine tag to a substrate that is bound to a solid support;

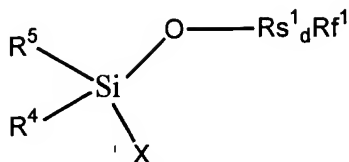
cleaving the fluorine-tagged substrate from the solid support while retaining the fluorine tag attached thereto;

reacting the cleaved fluorine-tagged substrate in a liquid phase reaction to synthesize a fluorine-tagged product; and

separating the fluorine-tagged product from other compounds using a fluorine separation technique.

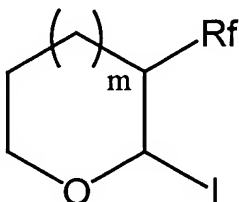
50. The method of Claim 49 further including the step of cleaving the fluorine tag from the fluorine-tagged product.

51. The method of Claim 50 wherein the fluororous tag has the formula:



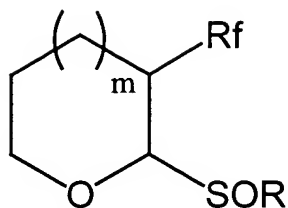
wherein Rf<sup>1</sup> is a fluorous group, Rs<sup>1</sup> is a spacer group, d is 1 or 0, R<sup>4</sup> is an alkyl group or an aryl group, R<sup>5</sup> is an alkyl group or an aryl group, and X is Cl, Br or I.

52. The method of Claim 50 wherein the fluororous tag has the formula:



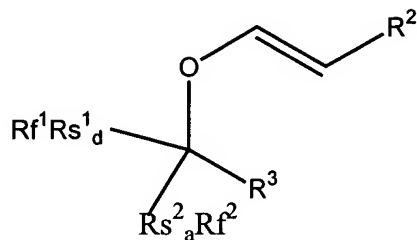
wherein Rf is a fluorous group and m is 0, 1 or 2.

53. The method of Claim 50 wherein the fluororous tag has the formula:



wherein Rf is a fluorine group, R<sup>1</sup> is an alkyl group or an aryl group and m is 0, 1 or 2.

54. The method of Claim 50 wherein the fluorine tag has the formula:



wherein Rf<sup>1</sup> and Rf<sup>2</sup> are independently, the same or different, fluorine groups, Rs<sup>1</sup> is a spacer group, d is 1 or 0, Rs<sup>2</sup> is a spacer group, a is 1 or 0, R<sup>2</sup> is a H, an alkyl group or an aryl group, R<sup>3</sup> is H or -Rs<sup>3</sup>Rf<sup>3</sup>, wherein, Rs<sup>3</sup> is a spacer group, e is 1 or 0, and Rf<sup>3</sup> is a fluorine group.